CLAIMS

1. A holographic recording medium having a recording layer which is multiplex recordable and is provided between a first substrate and a second substrate, wherein

a crosstalk layer having a thickness of 0.48 μm or more is provided directly on the recording layer or adjacent to the recording layer with a spacer layer interposed therebetween,

the crosstalk layer being set to exhibit no sensitivity or very low sensitivity to interference fringes of an object beam and a reference beam at the time of data hologram recording in the recording layer.

2. The holographic recording medium according to claim 1, wherein: the recording layer has a thickness of t_1; N data holograms can be angle-multiplex-recorded in one point in the recording layer; and a thickness t_2 of the crosstalk layer is $t_2 < t_1 / N$.

3. The holographic recording medium according to claim 1 or 2, wherein the crosstalk layer is arranged on a side of the recording layer, the side being opposite to an incident side of the object beam and the reference beam at the time of recording.

4. The holographic recording medium according to claim 1 or 2, wherein the crosstalk layer is provided between two layers of the recording layer such that the recording layer is split into the two layers.

5. The holographic recording medium according to claim 1 or 2, wherein a spacer layer made of a resin is provided between the recording layer and the crosstalk layer.

6. The holographic recording medium according to claim 3, wherein a spacer layer made of a resin is provided between the recording layer and the crosstalk layer.

7. A holographic record erasing method, comprising forming a crosstalk hologram in a crosstalk layer in a superposed manner with respect to data holograms multiplex-recorded in a recording layer of a holographic recording medium, the crosstalk layer being provided substantially adjacent to the recording layer and being set to exhibit no sensitivity or very low sensitivity to interference fringes of an object beam and a reference beam at the time of data hologram recording in the recording layer.

8. The holographic record erasing method according to claim 7, wherein: data holograms are angle-multiplex-recorded; and the reference beam for erasing has a beam diameter upon the projection onto the holographic recording medium 2 to 10 times the diameter of a beam which is projected onto the holographic recording medium at the time of data hologram recording.

9. The holographic record erasing method according to claim 8, wherein the reference beam for erasing is projected onto the holographic recording medium at an incident angle

within an incident angle modulation range of the reference beam at the time of recording.

10. The holographic record erasing method according to claim 8, wherein the reference beam for erasing is projected simultaneously or sequentially at a plurality of incident angles at an angular interval which corresponds to a plurality of angular pitches between the data holograms.

11. The holographic record erasing method according to claim 9, wherein the reference beam for erasing is projected simultaneously or sequentially at a plurality of incident angles at an angular interval which corresponds to a plurality of angular pitches between the data holograms.

12. The holographic record erasing method according to any one of claims 7 to 11, wherein the object beam for erasing is subjected to random amplitude modulation.

13. The holographic record erasing method according to any one of claims 7 to 11, wherein the object beam for erasing is projected through an objective lens having a numerical aperture smaller than a numerical aperture of an objective lens for projecting the object beam at the time of recording.

14. The holographic record erasing method according to claim 7, wherein: the data holograms are phase-code-multiplex-recorded; and the reference beam for erasing is subjected to phase-code-modulation by means of a pattern which is not orthogonal to a phase-code employed at the time of recording.

15. A holographic recording and reproducing apparatus comprising a holographic recording medium having a recording layer provided between a first substrate and a second substrate, a laser beam source, and an object optical system and a reference optical system which guide an object beam and a reference beam, respectively, split from a laser beam from this laser beam source to the holographic recording medium, in which the object beam and the reference beam are projected onto the recording layer to thereby form data holograms with the use of interference fringes thereby for recording information, and in which a reproduction beam similar to the reference beam is projected onto the recording layer to generate a diffraction beam to thereby reproduce the information the diffraction beam, wherein:

provided are a crosstalk layer which is arranged directly on the recording layer or adjacent to the recording layer with a spacer layer interposed therebetween and has a thickness of 0.48 μm or more, and an erasing optical system which forms a crosstalk hologram by projecting an object beam for erasing and a reference beam for erasing onto the crosstalk layer; and

the crosstalk layer is set to exhibit no sensitivity or very low sensitivity to interference fringes of the object beam and the reference beam at the time of recording of the data holograms.

16. The holographic recording and reproducing apparatus

according to claim 15, the object optical system and the reference optical system also serve as the erasing optical system.

17. The holographic recording and reproducing apparatus according to claim 15, wherein the erasing optical system projects onto the crosstalk layer the object beam for erasing and the reference beam for erasing each of which has a wavelength different from that of the object beam and the reference beam at the time of recording.

18. The holographic recording and reproducing apparatus according to any one of claims 15 to 17, wherein: the recording layer has a thickness of t_1; N data holograms can be angle-multiplex-recorded in one point in the recording layer; and a thickness t_2 of the crosstalk layer is $t_2 < t_1 / N$.

19. The holographic recording and reproducing apparatus according to any one of claims 15 to 17, wherein a spatial light modulator for subjecting the object beam for erasing to random amplitude modulation is provided in the erasing optical system.

20. The holographic recording and reproducing apparatus according to claim 18, wherein a spatial light modulator for subjecting the object beam for erasing to random amplitude modulation is provided in the erasing optical system.

21. The holographic recording and reproducing apparatus according to any one of claims 15 to 17, wherein: a phase

spatial light modulator for phase-code-modulating the reference beam is provided in the reference optical system; and a phase spatial light modulator for erasing which phase-code-modulates the reference beam for erasing by means of a pattern which is not orthogonal to a phase code employed in the recording is provided in the erasing optical system.

22. The holographic recording and reproducing apparatus according to claim 18, wherein: a phase spatial light modulator for phase-code-modulating the reference beam is provided in the reference optical system; and a phase spatial light modulator for erasing which phase-code-modulates the reference beam for erasing by means of a pattern which is not orthogonal to a phase code employed in the recording is provided in the erasing optical system.

23. The holographic recording and reproducing apparatus according to claim 19, wherein: a phase spatial light modulator for phase-code-modulating the reference beam is provided in the reference optical system; and a phase spatial light modulator for erasing which phase-code-modulates the reference beam for erasing by means of a pattern which is not orthogonal to a phase code employed in the recording is provided in the erasing optical system.